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10/620,685	07/17/2003	Akio Tajima	N03404US	9634

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EXAMINER	
LE, THI Q	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/620,685	TAJIMA, AKIO
	Examiner	Art Unit
	Thi Q. Le	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 21 May 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 17 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Action is in response to Applicant's amendment filed on 5/21/2007. **Claims 1-32 are** still pending in the present application. **This Action is made FINAL**

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 25-26 and 31-32** are rejected under 35 U.S.C. 102(b) as being anticipated by **Sugawara et al. (US PGPub 2002/0044315).**

Consider **claim 25**, Sugawara et al. clearly show and disclose, a switching device (read as, optical switching apparatus 1051-105n; figure 1) that transmits a plurality of external optical signals through a plurality of optical signal communication lines, comprising: a plurality of optical multiplexing and demultiplexing devices (read as, MUX and DMUX in figure 1) each corresponding to one of said plurality of optical signal communication lines and each device including an input and output port (read as, input and output ports of DMUX and MUX going into the switch; figure 1), wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication lines that corresponds to specific optical multiplexing and demultiplexing devices (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and

output from multiplexer to optical fiber; wherein the optical fibers are connected to other multiplexer and demultiplexer of another node; figure 1); and a plurality of optical switches (read as, optical switches 1051-105n; figure 1) that correspond to and communicates one of said plurality of external optical signals between said plurality of optical signal communication lines and an input and output port of one of said specific optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), wherein when no failure has occurred in one of said plurality of optical signal communication lines, and when a failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing device (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in protection fibers 1005-1008, when a working fiber is broken; figures 1, 2); and wherein bidirectional communication are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Consider **claim 26, and as applied to claim 25 above**, Sugawara et al. further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths (read as,

optical signals in fiber 1001-1008 consist of more than one wavelength, that is different than one another; figure 1, paragraph 0069).

Consider **claim 31**, Sugawara et al. clearly show and disclose, a switching device (read as, optical switching apparatus; title) that transmits an external optical signal through a ring-type network in which a plurality of optical signal communication lines are connected between adjacent communication nodes, comprising: a plurality of optical multiplexing and demultiplexing devices (read as, MUX and DMUX in figure 1) each corresponding to one of said plurality of optical signal communication lines and each device including an input and output ports (read as, input and output ports of DMUX and MUX going into the switch; figure 1), wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication line that corresponds to specific optical multiplexing and demultiplexing devices (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and output from multiplexer to optical fiber; wherein the optical fibers are connected to other multiplexer and demultiplexer of another node; figure 1); and a plurality of optical switches that correspond to and communicated one of said plurality of external optical signals between said plurality of optical signal communication lines and an input and output port of one of said specific optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), and when a

failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Consider **claim 32, and as applied to claim 31 above**, Sugawara et al. further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths (read as, optical signals in fiber 1001-1008 consist of more than one wavelength, that is different than one another; figure 1, paragraph 0069).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-7, 9-19, and 21-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hiroyuki, Tada (Japanese PGPub JP10336120)** and in view of **Fee (US Patent # 5,777,761)** and further in view of **Fukashiro et al. (US PGPub 2005/0025481)**.

Consider **claim 1**, Hiroyuki clearly shows and discloses, a communication node comprising: at least one optical signal transmitting communication line (read as, optical fibers 11 and 12, wherein either fiber can act as transmission line or receiving line; figure 1) to transmit an optical signal to said opposite communication node; at least one optical signal receiving communication line (read as, optical fibers 11 and 12, wherein either fiber can act as transmission line or receiving line; figure 1) to receive an optical signal from said opposite communication node; and a switching device (read as, switch Va and Vb; figure 1) being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figure 1; paragraph 0016), such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device to said optical signal transmitting communication line and to transmit an optical signal fed from said optical signal receiving communication line to said optical signal receiving device (read as, node 10A transmit data to node 10B using optical fiber 12, while receiving optical signal from node 10B through optical fiber 11; figure 1, paragraph 0017-0018), switching device switches so that said optical signal fed from said optical signal transmitting device is transmitted to said optical signal receiving

communication line (read as, node 10B switches transmission of optical signal from fiber 11 to fiber 12, when a failure occurs in fiber 11; figure 1, paragraph 0019-0020) and when a failure has occurred in said optical signal receiving communication line, said switching device switches so that said optical signal to be fed to said optical signal receiving device is received from said optical signal transmitting communication line (read as, when fiber 12 fails transmission from node 10A will be switch to fiber 11; figure 1, paragraph 0019-0020). Hiroyuki fails to disclose, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee disclose, an optical signal transceiver (read as, facility 136a; figure 1) having at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1) to transmit and receive an optical signal to and from an opposite communication node (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 2**, and **as applied to 1 above**, Hiroyuki modified by Fee and Fukashiro, further disclose, wherein wavelengths of optical signals transmitted from all said optical signal transmitting devices being placed in said optical signal transceiver are different from one another and from wavelengths of optical signals transmitted from said opposite communication node (note, Fee discloses bidirectional optical transmission of a plurality of optical signals with

different wavelengths. Further is it inherent that transmitted optical signals and received optical signals have different wavelengths to prevent interference; figure 1, column 3 line 63 – column 4 line 6, column 4 lines 601-67, column 5 lines 20-25).

Consider **claim 3**, and **as applied to 1 above**, Hiroyuki modified by Fee and Fukashiro, further disclose, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions (note, although Hiroyuki did not clearly disclose that the switch Va and Vb, in figure 1, are optical switches; it should be clear that those switches are optical in nature since the invention is related to optical transmission and also Hiroyuki did not discuss electrical signals within the invention. Further, Fee discloses an optical switch (SDS) 108a providing protection switching in an optical network; figure 1, column 4 lines 37-43).

Consider **claim 4**, Hiroyuki clearly shows and discloses, a communication node comprising: a plurality of optical signal communication lines (read as, optical fiber 11 and 12; figure 1) to transmit and receive an optical signal; and a switching device (read as, switches Va and Vb; figure 1) being connected to said optical signal transmitting device and to said optical signal receiving device (read as, optical units Wa and Wb; figure 1). Hiroyuki fails to disclose, a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device, which transmit and receive an optical signal to and from an opposite communication node; when a failure has occurred in one of said plurality of said optical signal communication lines, said switching device switches so that an optical signal that had been transmitted through said one of said plurality of optical signal communication lines is transmitted in a multiplexed manner through another of said plurality of

optical signal communication lines; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, a plurality of optical signal transceivers (read as, facilities 136a-c; figure 1) each having at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1), which transmit and receive an optical signal to and from an opposite communication node; when a failure has occurred in any of said plurality of said optical signal communication line (read as, optical fibers 106a-c; figure 1), said switching device switches so that an optical signal that had been transmitted through said optical signal communication line is transmitted in a multiplexed manner through another optical signal communication line (read as, optical signals were switched and multiplexed and transmitted through optical fiber 104; figure 1) (figure 1; column 4 lines 37-48; column 6 lines 15-20).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures

12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 5**, and **as applied to 4 above**, Hiroyuki modified by Fee and Fukashiro, further disclose, wherein a wavelength of an optical signal that had been transmitted through an optical signal communication line in which a failure occurred is different from a wavelength of an optical signal that is transmitted through an optical signal communication line in which said optical signal is transmitted in a multiplexed manner when a failure occurs in said optical signal communication line (note, Fee discloses bidirectional optical transmission of a plurality of optical signals with different wavelengths. Further is it inherent that transmitted optical signals

and received optical signals have different wavelengths to prevent interference; figure 1, column 3 line 63 – column 4 line 6, column 4 lines 601-67, column 5 lines 20-25).

Consider **claim 6**, and **as applied to 4 above**, claim 6 is rejected for the same reason as claim 3 above.

Consider **claim 7**, Hiroyuki clearly shows and discloses, a communication node being used in a ring-type network in which a plurality of said communication nodes is connected (figure 2), comprising: a switching device (read as, switch unit, figure 1 and 2) being connected to one optical signal communication line (read as, optical fiber 21 and 22; figure 2) connected to said one adjacent communication node, to an other optical signal communication line (read as, optical fiber 21 and 22; figure 2) connected to said other adjacent communication node (figure 2; paragraph 0024), which receives, such that when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal sent from said one adjacent communication node from said one optical signal communication line and transmits it to said optical signal receiving device and transmits an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node to said other optical signal communication line and relays an optical signal, when an optical signal fed from a communication node other than said one adjacent communication node making up said ring-type network is input from said other optical signal communication line to transfer it to said one optical signal communication line (read as, node 20D transmit data to node 20A using optical fiber 21, while receiving optical signal from node 20A through optical fiber 22; figure 2, paragraph 000025-0026), when the failure has occurred in said one optical signal communication line, said switching device switches so that said optical signal fed from said one

adjacent communication node is received from said other optical signal communication line and is transmitted to said optical signal receiving device and does switching, when the failure has occurred in said other optical signal communication line, so that said optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted to said one optical signal communication line (read as, node 20D switches transmission of optical signal from fiber 21 to fiber 22, when a failure occurs in fiber 21; figure 1, paragraph 0027-0028). Hiroyuki fails to disclose, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to receive an optical signal from one adjacent communication node and to transmit said optical signal to an other adjacent communication node; and a switching device connected to said optical signal transmitting device and to said optical signal receiving device; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, an optical signal transceiver (read as, facility 136a; figure 1) having at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1) to receive an optical signal from one adjacent communication node and to transmit said optical signal to an other adjacent communication node; and a switching device connected to said optical signal transmitting device and to said optical signal receiving device (read as, switch 108a is connected to facility 136a; figure 1) (figure 1; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical

signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 9**, and **as applied to 7 above**, claim 9 is rejected for the same reason as claim 3 above.

Consider **claim 10**, Hiroyuki clearly shows and discloses, a communication node being used in a ring-type network in which a plurality of communication nodes is connected, said communication node comprising (figure 2): an optical signal transmitting communication line (read as, optical fibers 21 and 22; figure 2) to transmit an optical signal to said adjacent communication node; an optical signal receiving communication line (read as, optical fibers 21 and 22; figure 2) to receive an optical signal from said adjacent communication node; and a switching device (read as, switching unite within nodes 20A-D; figure 2, paragraph 0024), such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said one of said plurality of optical signal transmitting devices to said adjacent communication node to said optical signal transmitting communication line and receives an optical signal sent from said adjacent communication node from said optical signal receiving communication line and transmits it to said one of said plurality of optical signal receiving devices (read as, node 20D transmit data to node 20A using optical fiber 21, while receiving optical signal from node 20A through optical fiber 22; figure 2, paragraph 000025-0026), when a failure has occurred in said optical signal transmitting communication line, said switching device switches so that an optical signal that had been transmitted from said one of said plurality of optical signal transmitting devices to said optical signal transmitting communication line is transmitted to said optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication line had been connected and does

switching (read as, node 20D switches transmission of optical signal from fiber 21 to fiber 22, when a failure occurs in fiber 21; figure 1, paragraph 0027-0028), when a failure has occurred in said optical signal receiving communication line, said switching device switches so that an optical signal that had been received from said optical signal receiving communication line and had been transmitted to said one of said plurality of optical signal receiving devices is received from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected (read as, node 20D switches received line from fiber 22 to fiber 21, when a failure occurs in fiber 22; figure 1, paragraph 0027-0028). Hiroyuki fails to disclose, an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to an adjacent communication node and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication node and to transmit and receive optical signals to and from both of said adjacent communication node; and a switching device being connected to one of said plurality of optical signal transmitting devices and to one of said plurality of optical signal receiving devices; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, an optical signal transceiver (read as, facility 136a; figure 1) having a plurality of optical signal transmitting devices (read as, transmitters 112a-116a; figure 1) to transmit an optical signal to an adjacent communication node and a plurality of optical signal receiving devices (read as, receivers 118a-122a; figure 1) to receive an optical signal from said adjacent communication node and to transmit and receive optical signals to and from both of

said adjacent communication node (figure 1; column 4 lines 15-20); and a switching device being connected to said optical signal transmitting device and to said optical signal receiving device (read as, optical switch 108a is connected to transmitters 112a-116a and receivers 118a-122a; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical

fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 11**, and **as applied to 10 above**, Hiroyuki modified by Fee and Fukashiro, further disclose, wherein wavelengths of optical signals to be transmitted from said optical signal transmitting device to said adjacent communication node are different from those of optical signals fed from said adjacent communication node (note, Fee discloses optical signal of plurality of wavelengths are transmitted between different nodes, figure 1, while using only one bidirectional fiber to communicate the optical signal. It would have been obvious to a person of ordinary skill in the art at the time of the invention to understand that in-order to avoid interference between optical signals, optical signal traveling in direction A must have different wavelengths than optical signal traveling in a direction opposite of direction A).

Consider **claim 12**, and **as applied to 10 above**, claim 12 is rejected for the same reason as claim 3 above.

Consider **claim 13**, Hiroyuki clearly shows and discloses, a switching device (read as, switching unit Va and Vb; figure 1), said switching device configured to be connected to at least one piece of an optical signal transmitting communication line to transmit an optical signal to said opposite communication node, at least one piece of an optical signal receiving communication line to receive an optical signal from said opposite communication node (read as,

switching unit is connected to optical fibers 11 and 12; figure 1, paragraph 0016), and wherein, when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device is transmitted to said optical signal transmitting communication line and an optical signal fed from said optical signal receiving communication line is transmitted to said optical signal receiving device (read as, node 10A transmit data to node 10B using optical fiber 12, while receiving optical signal from node 10B through optical fiber 11; figure 1, paragraph 0017-0018) and wherein, when a failure has occurred in said optical signal transmitting communication line, switching is done so that said optical signal fed from said optical signal transmitting device is transmitted to said optical signal receiving communication line (read as, node 10B switches transmission of optical signal from fiber 11 to fiber 12, when a failure occurs in fiber 11; figure 1, paragraph 0019-0020) and, when a failure has occurred in said optical signal receiving communication line, switching is done so that said optical signal to be fed to said optical signal receiving device is received from said optical signal transmitting communication line (read as, when fiber 12 fails transmission from node 10A will be switch to fiber 11; figure 1, paragraph 0019-0020). Hiroyuki fails to discloses, a switching device being connected to an optical signal transceiver comprising at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said optical signal transceiver; said switching device configured to be connected said optical signal transmitting device and said optical signal receiving device; a switching device includes at least two bi-

directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, a switching device (read as, optical switch 108a; figure 1) being connected to an optical signal transceiver (read as, facility 136a; figure 1) comprising at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1) to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said optical signal transceiver; said switching device configured to be connected to said optical signal transmitting device and said optical signal receiving device (read as, optical switch 108a is connected to facility 136a; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two

transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 14**, and **as applied to 13 above**, claim 14 is rejected for the same reason as claim 2 above.

Consider **claim 15**, and **as applied to 13 above**, claim 15 is rejected for the same reason as claim 3 above.

Consider **claim 16**, Hiroyuki clearly shows and discloses, a switching device (read as, switching unit Va and Vb; figure 1), said switching device configured to be connected to a plurality of optical signal communication lines to transmit and receive an optical signal between said optical signal transmitting device and said opposite communication node (read as, switching unit is connected to optical fibers 11 and 12; figure 1, paragraph 0016), wherein switching is

done, when a failure occurs in any of said optical signal communication lines (read as, node 10B switches transmission of optical signal from fiber 11 to fiber 12, when a failure occurs in fiber 11; figure 1, paragraph 0019-0020). Hiroyuki fails to discloses, a switching device being connected to a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said plurality of optical signal transceivers; said switching device configured to be connected to each said optical signal transmitting device, and each said optical signal receiving device; and wherein switching is done, so that an optical signal that had been transmitted through said optical signal communication line in which said failure has occurred is transmitted in a multiplexed manner through any other optical signal communication lines; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, a switching device (read as, optical switch 108a; figure 1) being connected to a plurality of optical signal transceivers (read as, facility 136a-c; figure 1) each having at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1) to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said plurality of optical signal transceivers; said switching device configured to be connected to each said optical signal transmitting device, and each said optical signal receiving device (read as, optical switch 108a is connected to facility 136a; figure 1); and wherein switching is done, so that an optical signal that had been transmitted through said optical

signal communication line in which said failure has occurred is transmitted in a multiplexed manner through any other optical signal communication lines (read as, optical signals were switched and multiplexed and transmitted through optical fiber 104; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50; column 4 lines 37-48; column 6 lines 15-20).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical

fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 17**, and **as applied to 16 above**, claim 17 is rejected for the same reason as claim 5 above.

Consider **claim 18**, and **as applied to 16 above**, claim 18 is rejected for the same reason as claim 3 above.

Consider **claim 19**, Hiroyuki clearly shows and discloses, a ring-type network (figure 2); a switching device (read as, switching units within each nodes 20A-D; figure 2, paragraph 0024), said switching device configured to be connected one optical signal communication line connected to said one adjacent communication node, to an other optical signal communication line connected to said other adjacent communication node (read as, switching unit is connected to optical fibers 21 and 22; figure 2, paragraph 0024), wherein, when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal fed from said one adjacent communication node is received from said one optical signal communication line and is transmitted to said optical signal receiving device and an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted to said other optical signal communication line and, when an optical signal fed from a communication node other than said one adjacent

communication node making up said ring-type network is input from said adjacent optical signal communication line, said optical signal is relayed to transfer it to said one optical signal communication line (read as, node 20D transmit data to node 20A using optical fiber 21, while receiving optical signal from node 20A through optical fiber 22; figure 2, paragraph 000025-0026), when a failure occurs in said one optical signal communication line, said switching device switches so that said optical signal fed from said one adjacent communication node is received through said other optical signal communication line and is transmitted to said optical signal receiving device and, when a failure has occurred in said other optical signal communication line, an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted to said one optical signal communication line (read as, node 20D switches transmission of optical signal from fiber 21 to fiber 22, when a failure occurs in fiber 21; figure 1, paragraph 0027-0028). Hiroyuki fails to discloses, a switching device being connected to an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device and receiving an optical signal from one adjacent communication node and transmitting an optical signal to an other adjacent communication node; and said switching device configured to be connected to said optical signal transmitting device and to said optical signal receiving device; a switching device includes at least two bi-directional ports; and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, a switching device (read as, optical switch 108a; figure 1) being connected to an optical signal transceiver (read as, facility 136a; figure 1) comprising at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one

optical signal receiving device (read as, receiver 118a; figure 1) and receiving an optical signal from one adjacent communication node and transmitting an optical signal to an other adjacent communication node; said switching device configured to be connected to said optical signal transmitting device and said optical signal receiving device (read as, optical switch 108a is connected to facility 136a; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch

to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 21**, and **as applied to 19 above**, claim 21 is rejected for the same reason as claim 3 above.

Consider **claim 22**, Hiroyuki clearly shows and discloses, a ring-type network (figure 2); a switching device (read as, switching units within each nodes 20A-D; figure 2, paragraph 0024), said switching device configured to be connected to an optical signal transmitting communication line to transmit an optical signal to said adjacent communication node, an optical signal receiving communication line to receive an optical signal from said adjacent communication node (read as, switching unit is connected to optical fibers 21 and 22; figure 2, paragraph 0024), wherein when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said optical signal transmitting device to said adjacent communication node is transmitted to said optical signal transmitting communication line and an optical signal fed from said adjacent communication node is received from said optical signal receiving communication line and is transmitted to said optical signal receiving device (read as, node 20D

transmit data to node 20A using optical fiber 21, while receiving optical signal from node 20A through optical fiber 22; figure 2, paragraph 000025-0026) and, when a failure has occurred in said optical signal transmitting communication line, switching is done so that an optical signal that had been transmitted from said optical signal transmitting device to said optical signal transmitting communication line is transmitted to an optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication line had been connected (read as, node 20D switches transmission of optical signal from fiber 21 to fiber 22, when a failure occurs in fiber 21; figure 1, paragraph 0027-0028) and when a failure has occurred in said optical signal receiving communication line, switching is done so that an optical signal that had been received from said optical signal receiving communication line and transmitted to said optical signal receiving device is received from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected (read as, node 20D switches received line from fiber 22 to fiber 21, when a failure occurs in fiber 22; figure 1, paragraph 0027-0028) (figure 2; paragraph 0031-0032). Hiroyuki fails to discloses, the switching device being connected to an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to adjacent communication nodes and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication nodes and to transmit and receive an optical signal to and from both of said adjacent communication nodes; said switching device configured to be connected to said plurality of said optical signal transmitting devices and said plurality of said optical signal receiving devices; a switching device includes at least two bi-directional ports; and

when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port.

In related art, Fee discloses, the switching device being connected to an optical signal transceiver (read as, facility 136a; figure 1) having a plurality of optical signal transmitting devices (read as, transmitters 112a-116a; figure 1) to transmit an optical signal to adjacent communication nodes and a plurality of optical signal receiving devices (read as, receivers 118a-122a; figure 1) to receive an optical signal from said adjacent communication nodes and to transmit and receive an optical signal to and from both of said adjacent communication nodes; said switching device configured to be connected to said plurality of said optical signal transmitting devices and said plurality of said optical signal receiving devices (read as, optical switch 108a is connected to facility 136a; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Hiroyuki. Since it is well known that optical signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is inherent that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, switching device includes at least two bi-directional ports (shown on figures 12a-b, the pair of optical transmitter/receiver 20-1 and 20-3 is connected to each other via the

respective optical crossconnect 1-1 and 1-3 by using the working optical fiber 30; the two transmitter/receiver 20-1 and 20-3 also connected to each other by protection optical fiber 40-1 and 40-2. It is inherent that the optical crossconnect 1-1 and 1-3 (i.e. switch device) includes a plurality of bi-directional ports; since transmitter/receiver 20-1 and 20-3 communication to each other through the optical crossconnect; figure 12A-B, paragraphs 0085-0090); and when there is a failure in the transmitting/receiving optical link, transmitting/receiving optical signal is switch to another bi-directional port (Fukashiro teaches, under normal condition optical signal is transmitted on the working optical fiber 30; and when a failure is detect in the working optical fiber 30, the optical signal is switched to the protection fibers 40-1 and 40-2; figures 12a-b, paragraphs 0085-0086)

It would have been obvious for a person of ordinary skill in the art at the time of the invention to modify the switch taught by Hiroyuki with the optical crossconnect taught Fukashiro. So, that optical path protection can be accomplished. Thus, improving the network reliability.

Consider **claim 23**, and **as applied to 22 above**, claim 23 is rejected for the same reason as claim 11 above.

Consider **claim 24**, and **as applied to 22 above**, claim 24 is rejected for the same reason as claim 3 above.

6. **Claims 8 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hiroyuki, Tada (Japanese PGPub JP10336120)** and in view of **Fee (US Patent # 5,777,761)** and further in view of **Fukashiro et al. (US PGPub 2005/0025481)** and further in view of **Tammela et al. (US Patent # 6,868,234)**.

Consider **claim 8**, and **as applied to 7 above**, Hiroyuki modified by Fee and Fukashiro disclosed the invention as described above, except for, wherein wavelengths of optical signals transmitted by all communication nodes making up said ring-type network are different from one another.

The examiner takes official notice that it would have been obvious for a person of ordinary skill in the art at the time of the invention to know that in order to prevent interference between different optical signals, the transmission wavelength for a plurality of optical sources are different from each other. Further, Tammela clearly shows a transmission ring network, wherein each node receiving and transmit a different wavelength comparing to all other nodes in the right network (figure 3; column 3 lines 17-25).

Consider **claim 20**, and **as applied to 19 above**, claim 20 is rejected for the same reason as claim 8 above.

7. **Claims 27 and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bortolini (US Patent # 6,813,408)** in view of **Sugawara et al. (US PGPub 2002/0044315)**.

Consider **claim 27**, Bortolini clearly shows and discloses, a switching device that transmits a plurality of external optical signals through a plurality of optical signal communication lines comprising: a plurality of first optical multiplexing and demultiplexing devices (read as, plurality of first (wavelength routing element) WRE 910, in figure 9a) each corresponding to one of said plurality of optical signal communication lines (read as, optical lines carrying optical signals 902 and 940; figure 9a) and including a first set of input and output ports (read as, port outputting signals O11-O43 WRE 910, in figure 9a) and a second set of input and output ports (read as, port receiving input 902 on WRE 910, figure 9a), wherein optical

signals of different types (read as, distinct spectral band) are communicated between said first set of input and output ports and said second set of input and output ports, and wherein each of said second set of input and output ports are connected to said at least one of said plurality of optical signal communication lines corresponding to each of said plurality of first optical multiplexing and demultiplexing devices (read as, optical line carrying optical signal 901 is connected to WRE 910; figure 9a) (Figure 9a; column 13 line 31 – column 14 line 9); a plurality of second optical multiplexing and demultiplexing devices (read as, WRE 912; figure 9a) each including a third set of input and output ports (read as, port outputting optical signal 940; figure 9a) and a fourth set of input and output ports (read as, port receiving signal I11-I43; figure 9a), wherein optical signals of different types (read as, distinct spectral band) are communicated between said third set of input and output ports and said fourth set of input and output ports, wherein each of said third set of input and output ports are connected to at least one of said plurality of external optical signals (read as, port outputting optical signal 940 is also connected to optical line that carries the optical signal 940; figure 9a) (Figure 9a; column 13 line 31 – column 14 line 9).

Bortolini fails to disclose an optical switch between said plurality of optical signal communication lines and said plurality of second optical multiplexing and demultiplexing devices, said optical switch corresponding to each of said plurality of second optical multiplexing and demultiplexing devices, wherein said fourth set of input and output pors of said plurality of second optical multiplexing and demultiplexing device being corresponding to said optical switch that communicates to said first set of input and output ports of a specified one of said plurality of first optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines corresponding to said

specified one of said plurality of first optical multiplexing and demultiplexing devices, and communicates from said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices to a first set of input and output ports of an other said plurality of first optical multiplexing and demultiplexing device when a failure has occurred in said one of said plurality of optical signal communication lines. Wherein bidirectional communications are conducted through the input and output ports.

In related art, Sugawara et al. disclose, an optical switch between said plurality of optical signal communication lines and said plurality of second optical multiplexing and demultiplexing devices , said optical switch corresponding to each of said plurality of second optical multiplexing and demultiplexing devices (read as, optical switch 1051-105n are between optical communication lines 1003, 1004, 1007, 1008 and MUX/DEMUX 1010, 1011, 1014, 1015; figure 1), wherein said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing device being corresponding to said optical switch that communicates to said first set of input and output ports of a specified one of said plurality of first optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines corresponding to said specified one of said plurality of first optical multiplexing and demultiplexing devices (read as, MUX/DEMUX 1010, 1011, 1014, 1015 input and output ports are connected to optical switch 1051-105n; optical switches are connected to input and output ports of MUX/DEMUX 1012, 1013, 1016, 1017. Wherein optical signal are transferred through the configuration bidirectionally; figure 1) (paragraph 0069-0071), and communicates from said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices to a first set of input and

output ports of an other said plurality of first optical multiplexing and demultiplexing device when a failure has occurred in said one of said plurality of optical signal communication lines (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), Wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075.

It would have obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teaching of Sugawara et al. with Bortolini. Since for an optical network to reliable in the event of a failure, of components or optical fibers, then it is necessary to be able to have a plurality of optical fibers along with switching capabilities. So that in an event there are failures within the network, the transmission path can be switch to another path easily and quickly.

Consider **claim 28, and as applied to claim 27 above**, Bortolini as modified by Sugawara et al. further disclose, wherein said first set of input and output ports of said plurality of first optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths (read as, WRE 910 receiving optical signal 902 with a plurality of distinct spectral bands; Bortolini, figure 9a) and said third set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths (read as, WRE 912 outputting optical signal 940 with a plurality of distinct spectral bands; Bortolini, figure 9a) (Bortolini; Figure 9a; column 13 line 31 – column 14 line 9)).

8. **Claims 29 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sugawara et al. (US PGPub 2002/0044315)** in view of **Yamashita et al. (US Patent # 5,675,676)**.

Consider **claim 29**, Sugawara et al. disclose, a switching device (read as, optical switching apparatus) connected between two optical signal communication lines making up a ring-type network for transmitting an external optical signal through said ring-type network, comprising: two optical multiplexing and demultiplexing devices (read as, MUX and DMUX 1010-1017 in figure 1) each being placed so as to correspond to each of said two optical signal communication lines and each of said two devices including a first set of input and output ports (read as, MUX/DEMUX 1010-1017 ports' that are connected to optical switch 1051-105n; figure 1) and a second set of input and output ports (read as, MUX/DEMUX 1010-1017 ports' that are connected to optical fiber 1001-1008; figure 1), wherein optical signals of different types are communicated between said first set of input and output ports and said second set of input and output ports (read as, optical signal with a plurality of wavelength are communicated through the apparatus; figure 1), and wherein two optical signal communication lines corresponding to each of said two optical multiplexing and demultiplexing devices are connected to said second set of input and output port (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and output from multiplexer to optical fiber) (figure 1 and 2a; paragraph 0069-0071); and a plurality of optical switches that correspond to and communicates said external optical signal between said two optical signal communication lines and said two optical multiplexing and demultiplexing devices, wherein when no failure has occurred in one of said two optical signal communication lines connected to said two optical multiplexing and

demultiplexing devices, an external optical signal corresponding to each of said optical switches is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), and when a failure has occurred in said one of said two optical signal communication lines, said external optical signal is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices corresponding to an other one of said two optical signal communication lines read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Sugawara et al. fail to disclose, wherein said first set of input and output ports be connected to one another.

In related art, Yamashita et al. disclose an optical branching apparatus. Wherein, one of the outputs from a multiplexing and demultiplexing unit is connection to one of the inputs of another multiplexing and demultiplexing unit. This arrangement has the purpose of allowing transmission path rerouting in the event of a failure, but without the use of an optical switch (figure 1; column 1 lines 1-43).

It would have obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teaching of Yamashita et al. with Sugawara et al. Since, the possibility of a switch failing is there; if the switch fails then there are no other means for rerouting transmission path. Thus, if there are optical fibers connection between each multiplexing and demultiplexing units within a node, then when the switch fail, the signal can be rerouted using the optical fibers.

Consider **claim 30, and as applied to claim 29 above**, Sugawara et al. as modified by Yamashita et al. further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths (read as, optical signal with a plurality of wavelength are communicated through the apparatus; Sugawara, figure 1, title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Response to Arguments

9. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 5/21/2007 with respect to claims 25-32 have been fully considered but they are not persuasive.

On pages 24-25, the applicant argues that Sugawara does not teach or suggest, "*wherein bidirectional communication are conducted through the input and output ports*"; and fails to disclose or suggest that if a failure occurs in one piece of optical fiber transmission line, bi-directional communication can be achieved through another piece of the optical fiber transmission line. The Examiner disagrees, shown in figures 2A-C there are a plurality of ports 5, 6 and 7 for transmitting optical signal from node 1 to node 2; while not shown, it is inherent

that there are another set of ports for transmitting optical signal from node 2 to node 1 (indicated by arrows connecting switch 2-3 to demux 2-1 in the west-east direction) (paragraphs 0071-0074). Thus is should be clear that bi-directional communication is occurring. Applicant's argues that Sugawara discloses fiber optic pairs that enable bi-directional communication between nodes based on opposite but unidirectional communication in each respective fiber optical cable, on page 25. The limitation of claim 25 only requires "bidirectional communication are conducted through the input and output ports"; thus, the applicant's argument is not pertinent to the claimed limitation. Further, shown in figures 2B-C, when there is a failure in the Service optical link (i.e. the top link) communication is switched to the Protection optical link (i.e. bottom link) (paragraphs 0071-0074).

On pages 29-33, the applicant argues with the same argument as above for claims 27-30. Thus, the same reasoning as above is applied.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

13. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Perez-Gutierrez can be reached on (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER